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Report of the Departmental Committee on Foot-and-Mouth Disease, 1952-54

The Committee's Report, which takes the form of a document nearly 160 pages in length, including various appendices, is issued just as we go to press. Time does not permit of a detailed analysis of the contents in this issue of the *Record*, nor of comment sufficiently considered to do justice to so substantial a piece of work. We publish below the Summary of Conclusions and Recommendations, which forms Chapter 6, and shall deal in greater detail with the Report in our next issue.

Our readers will note that Sir Ernest Gowers's Committee—which included the junior Vice-President of the B.V.A., Professor A. Robertson, M.A., B.SC., PH.D., M.R.C V.S., F.R.I.C., F.R.S.E.—fully endorses the policy advocated by the veterinary profession in this country, and pays well deserved compliments both to the research workers and to the field staff. The Summary of Conclusions and Recommendations is as follows :—

1. Seriousness of foot-and-mouth disease

The disease would rapidly establish itself as endemic in any country that failed to take energetic and rigorous measures to prevent it. If it were to do so in this country the result would be a national calamity (paragraph 5).

2. Introduction of the disease into this country

(1) *By birds*

(*a*) The case against the starling is formidable but it has not been proved (paragraph 18).

(*b*) Seagulls may be as serious a danger as starlings (paragraph 20).

(*c*) There seems small reason to suspect racing pigeons (paragraph 22).

(2) *By the wind*

It seems possible that in certain circumstances the virus might be carried to this country by the wind (paragraph 23).

(3) *By persons and motor vehicles arriving from the Continent*

Regular disinfection is not justifiable but circumstances might arise in which disinfection might be a wise precaution and the Ministry ought to have the power to impose it (paragraph 45).

(4) *By imported meat and animals*

(*a*) The measures to prohibit and control imports in this category that might be dangerous seem to be fully effective except as regards imported chilled and frozen meat from South America (paragraph 24). So long as we have to import meat from there, and as long as foot-and-mouth disease is endemic on that Continent, there must always be a risk that contaminated meat may cause outbreaks (paragraph 29).

(*b*) Swill that contains infected meat, or other waste contaminated by it, is a source of infection that is clearly of great importance (paragraph 26).

3. Collection of waste food (paragraph 40)

(1) All local authorities should be empowered (but none should be compelled) to dispose of waste food for feeding to animals.

(2) All waste food, whether collected by a local authority or privately, to be used for feeding to animals, should be sterilised by the collector.

(3) All substantial collectors of waste food other than local authorities should be required to take out a licence imposing on them an obligation to use an approved sterilising plant which would be periodically inspected.

(4) The question should be considered of assigning to local authorities the task of licensing collectors and inspecting their boilers or sterilising plant.

4. Disposal of refuse containing waste food (paragraph 42)

(1) If the statutory obligations of local authorities do not already include the duty of disposing of their refuse so as to involve no danger to animal health, the law should be amended.

(2) If that is already the duty of local authorities, the Government Departments concerned should make every effort to see that it is carried out.

5. International action against foot-and-mouth disease

International collaboration is essential for effective control (paragraph 88). The British Government should take any action in their power to resuscitate the interest of the other European Governments in the establishment of the European Commission for the Control of Foot-and-Mouth Disease (paragraph 90).

6. Vaccination against foot-and-mouth disease

(1) It may be accepted that in adult cattle monovalent and bivalent vaccines can give 90 per cent. protection (paragraph 100 (*a*)).

(2) It takes about 14 days for vaccination to produce full immunity (paragraph 100 (*b*)).

(3) It would not be safe to reckon on full immunity lasting for more than four months (paragraph 100 (*c*)).

(4) Young stock, particularly unweaned animals, are at least more difficult to vaccinate effectively than adult stock (paragraph 100 (*d*)).

(5) It seems probable that vaccines specific for sheep and pigs will be found necessary for the effective vaccination of these animals (paragraph 100 (*e*)).

(6) The possible danger of vaccines giving an animal the disease is not a serious argument against vaccination (paragraph 100 (*f*)).

(7) The possibility of masked infection by foot-and-mouth disease in animals vaccinated against it cannot safely be ignored (paragraph 100 (*g*)).

7. Vaccination in Great Britain as a substitute for stamping-out

In the circumstances of to-day, and of the immediate future so far as they are foreseeable, any idea that it would be possible to do away with stamping-out by making the whole susceptible animal population—or even all cattle—immune by vaccination is in the realm of fantasy (paragraphs 98 and 99). In the present circumstances stamping-out must continue to be the policy in Great Britain (paragraph 96).

8. Stamping out and vaccination in combination in Great Britain

(1) *In normal times*

(*a*) *Ring vaccination.*—The adoption of Ring vaccination in the circumstances of this country would not in normal times make any contribution to checking the disease that would justify the expense and diversion of effort it would entail (paragraph 110).

(*b*) *Frontier vaccination.*—This would not be suitable in the circumstances of Great Britain (paragraph 111).

(*c*) *Compulsory vaccination of particular herds.*—There could be no possible justification for compelling the owner of any particular herd in this country to vaccinate in normal times (paragraph 113).

(*d*) *Voluntary vaccination.*—This should not be allowed pending the result of experiments into the reality of the danger of masked infection. The question should then be considered afresh (paragraph 119).

(*e*) The effect on our export trade in livestock will have to be taken seriously if ever the introduction of vaccination is thought to be desirable (paragraph 120).

(2) *During an epidemic*

(*a*) Preparations ought to be made for the use of vaccination in the event of the disease becoming so widespread that slaughter was no longer practicable or economic (paragraph 121).

(*b*) It would clearly be prudent to begin vaccination before an epidemic became so serious that slaughter had to be abandoned and to use the two methods in combination ; but at just what stage this should be started can only be decided at the time in the light of all the circumstances (paragraph 126).

9. Pirbright Research Institute

(1) The Institute deserve the reputation they have widely won as the most important centre in the world for research into foot-and-mouth disease (paragraph 125).

(2) The extension of the Institute that is now being carried out should prove most valuable, but it does not seem to be on a scale adequate for the supply of vaccine in the quantities that would be needed if recourse to vaccination were necessary to combat an emergency (paragraphs 123 and 124).

(3) The present arrangements for the administration of the Institute should be clarified (paragraph 125).

10. Veterinary Research Council

The creation of such a body deserves careful consideration (paragraph 125).

11. The use of serum

It has all the drawbacks of vaccination and none of its advantages (paragraph 130).

12. Alleged cures and preventives

None of those brought to our notice have advantages over orthodox vaccination (paragraphs 131 to 135).

13. The 1951-52 epidemic in Great Britain

(1) The heavy invasion of eastern and southern England was resisted with no small success but a single outbreak in the Midlands that was not reported early enough was responsible for over half of the outbreaks that occurred during the epidemic (paragraphs 137 and 138).

(2) The disease was taken to Scotland by calves that were fed at Crewe station, while *en route*, with infected milk (paragraph 139).

(3) Unboiled swill, stored in the open, which contained scraps of meat salvaged from the carcases of apparently healthy contact animals was regarded as the origin of 83 outbreaks in Dumfries, Kirkcudbright and Cumberland (paragraph 140).

14. The Ministry's control arrangements

(1) *The size of the infected area*

The standard size should be reduced from a radius of 15 miles to one of 10 miles (paragraph 144).

(2) *Signposting of the infected area*

At least the main roads leading into the infected area should have warning signposts (paragraph 146).

(3) *Artificial insemination in the infected area*

This should be permitted more freely. When the service has been suspended for three weeks, it should be the rule rather than the exception—even in prolonged outbreaks—for it to be resumed everywhere in the infected area except within two miles of the infected farm (paragraph 156).

(4) *Closing of footpaths and roads in the infected area*

The police should be empowered to close footpaths. When it is necessary to disinfect roads, both the police and the Ministry's veterinary officers should have power to close them (paragraphs 147 and 148).

(5) *Controlled area restrictions*

They have never been imposed without reasonable justification. The Ministry's discretion in this connection should not be fettered (paragraph 158).

(6) *Movement of susceptible animals into and within infected and controlled areas*

The various Orders should be consolidated and simplified (paragraph 160).

(7) *Movement licences*

Counter-signature should be abolished (paragraph 161).

(8) *Inspectors under the Diseases of Animals Act*

(*a*) Local authorities should always appoint policemen as inspectors (paragraph 162).

(*b*) The handbook of instructions should be brought up to date and the Ministry should supply all inspectors with copies free of charge (paragraph 163).

(9) *Control of the disease in Scotland*

The present system of unified control throughout Great Britain should be maintained (paragraph 167).

(10) *The extent of slaughter*

An effective stamping-out policy must include the slaughter of contact animals. The question what contact is close enough to justify slaughter must continue to be decided in every case by the Ministry's veterinary officer (paragraph 180).

(11) *The place of slaughter*

Slaughter must continue to be carried out on the infected farm (paragraph 182).

(12) *The disposal of the carcases*

These should be burned instead of buried (paragraph 185).

(13) *Salvaging the carcases of apparently healthy contact animals for human consumption*

This practice should be stopped (paragraph 189).

(14) *Disinfection of infected premises*

Power-equipment should be used. The employment of trained squads should be considered (paragraph 177).

(15) *Disinfection at markets of animal-carrying road vehicles*

All market authorities should be obliged to provide proper facilities, including piped water, for cleansing and disinfecting vehicles (paragraph 178).

(16) *Feeding of milk to calves in transit*

This should be prohibited (paragraph 168).

(17) *Churn washings and waste milk*

These should not be taken away from dairies (or cheese factories) receiving milk from infected areas unless heat-treated sufficiently to destroy the virus (paragraph 169).

(18) *Sterilisation of milk churns*

This should be carried out by milk distributors before they send the churns back to the farms (paragraph 170).

(19) *Milk lorries*

(*a*) These should be prohibited from entering farms in infected areas. Farmers in those areas should put their churns on loading platforms on the roads (paragraph 170).

(*b*) It would be a wise precaution if, in seriously affected areas, separate lorries were used for the conveyance of empty and full churns (paragraph 170).

(20) *Point-to-point races in infected areas*

These should be prohibited (paragraph 171).

(21) *Troops on manoeuvres*

These should not be allowed to go within two miles of infected premises (paragraph 172).

(22) *Slaughterhouse offal*

The practice of spreading this on agricultural land should be prohibited (paragraph 173).

(23) *Movement of animals by cattle dealers*

When the Tuberculosis Eradication Scheme has been completed, the Ministry should consider the imposition of a rule that cattle must be detained for six days at the next destination after every exposure for sale (paragraph 174).

(24) *Publicity about outbreaks of foot-and-mouth disease*

(*a*) Regional officers of the Central Office of Information should keep in close touch with the Ministry's local veterinary officers when outbreaks occur (paragraph 192).

(*b*) The Ministry should give the Press information about new outbreaks in infected areas (paragraph 193).

(*c*) Both the Press and the B.B.C. should be notified when infected area restrictions are withdrawn (paragraph 194).

(*d*) Both the Press and the B.B.C. should be given information about any exceptional building-up of infection on the other side of the North Sea or English Channel (paragraph 195).

(*e*) When restrictions are imposed, all farmers in the infected area should be notified individually by the police (paragraph 196).

(*f*) All veterinary surgeons practising in an infected area should be notified immediately of all outbreaks that occur in that area (paragraph 197).

(25) *Education about foot-and-mouth disease*

(*a*) *Farmers.*—The Ministry should give farmers full information about the symptoms of the disease and consider whether it is practicable to introduce some such scheme of continuous education on the subject as has been adopted in some European countries (paragraphs 198 and 199).

(*b*) *The general public.*—More might be done to educate people in the neighbourhood of outbreaks about the danger of the disease (paragraph 200).

(*c*) *Veterinary surgeons.*—The Ministry should make every effort to overcome the handicap from which the veterinary surgeon in private practice at present suffers by lack of experience of the disease (paragraph 201).

(26) *Reporting of the disease*

In addition to reporting suspected foot-and-mouth disease, farmers in infected areas should report *any* illness in susceptible animals (other than hill sheep) (paragraph 202).

(27) *Penalties for delayed reporting*

(*a*) The power to withhold compensation should be abrogated (paragraph 204).

(*b*) The maximum fines should be increased to £500, or where the offence is committed with respect to more than 10 animals, £50 for each animal (paragraph 205).

(*c*) The liability to imprisonment for a second offence should not be limited to a second offence committed within 12 months (paragraph 206).

(28) *Insurance policies*

The "waiting period" should be abolished (paragraph 207).

(29) "*Compensation*" *for slaughtered animals*

This is fair (paragraph 208).

(30) *Compensation for consequential losses*

This principle should not be accepted (paragraph 208).

(31) *Agricultural shows* (*exhibition of cloven-hoofed animals*)

The Ministry's arrangements cannot reasonably be other than those now in operation (paragraph 210).

15. The Ministry's veterinary staff

(1) During the 1951–52 epidemic they carried out their duties with a zeal and efficiency deserving the highest praise (paragraph 211).

(2) Care should be taken to ensure that the conditions of service are such as will continue to attract men of a calibre adequate to the discharge of the exacting duties (paragraph 212).

INVITATION TO ITALY

An Italian veterinary surgeon living in Valmontone (Rome) has written, via The British Council, inviting a British veterinary surgeon to spend about a fortnight with him in September to see something of the methods of stock raising in Italy, inspection of slaughtering, etc. He does not speak English, but knows French quite well; he would not mind having a British veterinary surgeon who could only speak English, because he hopes to have another guest at the same time who would act as interpreter.

If any member of the B.V.A. is interested in this offer, would he please write, *at once*, to the General Secretary, The British Veterinary Association, 7, Mansfield Street, Portland Place, W.1.

STUDIES IN THE ACUTE TOXICITY OF DIELDRIN TO SHEEP

BY

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Introduction

Dieldrin is an oxidised chlorinated hydrocarbon insecticide which was introduced in 1948 as Compound 497. It is prepared by the Diels Alder reaction from which it derived the name of "Dieldrin." Fiedler & du Toit, 1951, were the first to note that Dieldrin was lethal to the larval stages of the sheep maggot fly, *Lucilia cuprina*, and Downing, Harbour & Stones, 1952, observed that it was also effective against the sheep maggot fly of this country, *Lucilia sericata*. As a result of laboratory and field trials, Stones, Wood & Hart, 1952, demonstrated that the application of 0·05 per cent. Dieldrin to sheep gave protection against body "strike" of 16 weeks, which was the entire period of their observation.

When it became apparent after some preliminary tests that Dieldrin dips were likely to be effective for the prevention of maggot fly strike, an investigation was made into the toxic hazards of Dieldrin to sheep, the results of which form the subject of this paper. Dieldrin has a greater mammalian toxicity than DDT or BHC, and the acute oral L.D.50 of Dieldrin to laboratory animals is stated by Lehman, 1950, to be 87 mg. per kg., in comparison with 250 mg. per kg. for DDT. Dieldrin is absorbed by the unbroken skin and, according to Lehman, it is more toxic on the skin than when swallowed. It was therefore decided to commence this investigation into the mammalian toxicity of Dieldrin by an assessment of its oral and dermal toxicity to mice. The results of this work, which will be described in this paper, were in some agreement with the observations of Lehman. However, tests with guinea-pigs indicated that the toxicity of Dieldrin, applied externally as a dip, was less than its oral toxicity, and sheep in full fleece could withstand dipping in concentrations of Dieldrin, which represented an external application of 700 mg. per kg., which is 14 times the oral toxic dose. It is pertinent to observe here that the "dermal toxicity" to which Lehman refers is assessed from the application of measured amounts of a compound on to the shaved skin of rabbits. In this investigation, where Dieldrin was applied as a dip to animals carrying their normal skin covering, the insecticide retained by the hair or wool was included in the estimations of the amount of the Dieldrin deposited on the body surface of the animal.

When the results of this work indicated that sheep could be dipped in insecticidal concentrations of Dieldrin with safety, a series of trials was initiated to investigate the behaviour of Dieldrin dips under field conditions. A survey of these trials, which involved over 32,000 sheep, is included in this paper.

Methods

1. *General*

All the animals were examined and weighed before exposure to Dieldrin, and those showing any abnormality were discarded. The normal routine of animal management was practised throughout the tests. The following criteria of stress were used to identify a toxic reaction.

(*a*) Mortality.
(*b*) Change in bodyweight.
(*c*) Signs of ill-health detected by a general clinical examination.
(*d*) *Post-mortem* examination.

2. *Mice*

General.—Albino mice were arranged in groups of six according to their weights, and each group was confined in a metal mouse-box. The mice were allowed cubes (Thompson formula), free access to water, and were maintained at a room temperature of 65° to 70° F.

Oral administration.—The appropriate amount of Dieldrin, dissolved in olive oil, was introduced by a syringe into the stomach of the mouse, using a blunt ended hypodermic needle.

Dipping.—Each mouse was confined in a wire gauze cage, and both mouse and cage were immersed for 15 seconds in 300 ml. of an emulsion of solvent naphtha containing Dieldrin. The head of the mouse was not immersed, apart from an initial ducking. The mouse was then returned to its box, after the surplus dip wash had drained from its coat.

3. *Guinea-pigs*

General.—The guinea-pigs were made up into groups of four, and each group was confined in a metal cage. The guinea-pigs were fed oats, hay, and green food, allowed free access to water, and maintained at a room temperature of 60° to 65° F.

Oral administration.—The Dieldrin was administered by a syringe through a blunt hypodermic needle, which was passed over the back of the tongue.

Dipping.—Each guinea-pig was immersed for 30 seconds in 5,000 ml. of an emulsion of solvent naphtha containing Dieldrin. The guinea-pig was weighed immediately prior to the dipping, and weighed again 15 minutes after the dipping. The gain in weight observed at the post dipping weighing provided an indication as to the amount of dip wash retained in the coat.

4. *Sheep*

General.—The sheep were maintained in concreted yards and fed concentrates and hay, and allowed free access to water.

Oral administration.—An emulsion of Dieldrin, contained in solvent naphtha, was introduced into the rumen of the sheep through a rubber tube.

Dipping.—Each sheep was immersed for 30 seconds in a 140-gallon dip bath, after which it was confined in a draining pen until the excess wash had ceased to drip from the fleece. The sheep were then returned to concrete yards, where they were kept under continual daily observation for a week, and intermittent observation for a further seven days.

Results

1. *Mice and Guinea-pigs*

The results of the oral administration and external application of Dieldrin to mice, and guinea-pigs, are given in Tables I and II.

The acute oral L.D.50 of a Dieldrin solution in olive oil to mice was 75 to 100 mg. per kg., but the lethal toxic range commenced at 10 mg. per kg. The L.D.50 application of the Dieldrin emulsion was 40 to 80 mg. per kg., and the toxic range commenced at 8 mg. per kg. The figures representing the toxicity of Dieldrin applied externally were based on the finding that a mouse retains 1·5 ml. of the dip wash on its coat after the immersion.

With guinea-pigs the acute oral L.D.50 of a Dieldrin solution in olive oil was 10 to 25 mg. per kg., in which range the first indications of toxicity were also observed. The assessment of the toxicity of the external application of Dieldrin to guinea-pigs was based on the finding that each animal retained on the average 30 ml. of wash after immersion, from which the L.D.50 of Dieldrin applied externally was assessed at 120 mg. per kg.

TABLE I
THE ORAL TOXICITY OF DIELDRIN

A solution of 1 per cent. Dieldrin in olive oil was used for dosing mice and 5 per cent Dieldrin in olive oil for dosing guinea-pigs.

Dieldrin mg. per kg.	Mice			Guinea-pigs		
	Dosed	Dead	Mort. %	Dosed	Dead	Mort. %
Olive oil only	72	0	0	8	0	0
5	25	0	0	—	—	—
10	47	2	3	8	0	0
25	72	8	9	12	8	66
50	72	18	25	8	8	100
75	72	35	48	8	8	100
100	47	38	80	4	4	100

Table II tabulates the results of the mouse and guinea-pig immersion tests, in which an emulsion of solvent naphtha containing Dieldrin was used.

TABLE II
DIELDRIN IMMERSION TESTS

Amount of Dieldrin retained on the animal's body in mg. per kg.	Dieldrin conc. in dip wash	Mice			Guinea-pigs		
		No. Dipped	No. Dead	Mort. %	No. Dipped	No. Dead	Mort. %
Nil	Water only	24	0	0	20	0	0
Nil	Emulsion without Dieldrin	24	0	0	6	0	0
4	0·005%	10	0	0	—	—	—
8	0·010%	24	2	8	—	—	—
40	0·050%	24	10	42	—	—	—
80	0·100%	24	16	66	—	—	—
120	0·150%	24	21	88	16	2	12
150	0·250%	—	—	—	32	17	53
240	0·400%	—	—	—	4	4	100
360	0·600%	—	—	—	4	4	100

2. *Sheep*

The results of the dosings and dippings of sheep with the Dieldrin solvent naphtha emulsion are summarised in Table II. Twenty-four sheep were used in these tests and represented the following breeds: Southdown, Dorset and Border Leicester—Suffolk crosses. The sheep were 9 to 12 months old, and their individual weights varied from 25 to 40 kg. with an average of 30 kg.

The results of the oral administration of the Dieldrin emulsion to sheep showed that one of three sheep died after being dosed with 50 mg. per kg. Dieldrin, and two out of three sheep died when 75 mg. per kg. Dieldrin was administered. The acute oral L.D.50 of Dieldrin may therefore be within the range 50 to 75 mg. per kg. Dieldrin. It was estimated that half a gallon of dip was retained by the sheep after the surplus wash had drained from the fleece. The amount of Dieldrin retained by these sheep, when they were dipped in 0·50, 0·75, or 1·100 per cent. Dieldrin would therefore approximate 350, 525, and 700 mg. per kg. respectively for a 30 kg. sheep. With one exception, the only sheep to show a toxic reaction following the dipping were those animals which had received Dieldrin by mouth. The exception was one sheep, which survived dipping in 0·50 per cent. Dieldrin, but died after being redipped in 0·75 per cent. Dieldrin 14 days later.

These results indicated that absorption of Dieldrin following dipping had occurred but the amount of the insecticide taken into the body of sheep following a single dipping in a concentration of 1·00 per cent. Dieldrin, or below, was insufficient to cause a toxic reaction. It was therefore apparent that there was a wide margin of safety for a sheep dip at a concentration of 0·05 to 0·10 per cent. Dieldrin which has been found to be the effective range for the prevention of maggot fly strike, under British conditions.

FIELD SURVEY

Fifty-two flocks, representing a total of 32,071 sheep were immersed in dip washes containing 0·6 to 0·05 per cent. Dieldrin, without evidence of Dieldrin intoxication. The dip baths ranged in capacity from 200 to 700 gallons. With the exception of 400 ewes dipped in early spring the dippings were carried out in the summer, three to four weeks after shearing. The details of this survey have been summarised in Table IV, where an attempt has been made to classify the sheep into lambs, ewes, rams, and shearlings.

TABLE III
DOSINGS AND DIPPINGS OF SHEEP IN AN EMULSION OF SOLVENT NAPHTHA CONTAINING DIELDRIN

No. of Sheep in Group	Treatment 17/9/52	Reaction	Treatment 30/9/52	Reaction	Treatment 14/10/52	Reaction	Treatment 4/11/52	Reaction
	Dose of Dieldrin mg. per kg.		Dipping Dieldrin conc.		Dipping Dieldrin conc.		Dipping Dieldrin conc.	
3	25	All reacted	0·5%	Nil	0·75%	One died	1·0%	Nil
3	50	All reacted One died	0·5%	Nil	0·75%	Two died	—	—
3	75	All reacted Two died	0·5%	One died	—	—	—	—
5			0·5%	Nil	0·75%	One died	1·0%	Nil
5					0·75%	Nil	1·0%	Nil
5							1·0%	Nil

A number of farmers, however, combined "ewes and lambs" and these totals have been described as "unidentified."

TABLE IV

Class of Sheep	Dieldrin Emulsion				Dieldrin Wettable Powder		Total
	Dieldrin concentrations				Dieldrin concentrations		
	0·3%	0·1%	0·08%	0·05%	0·6%	0·05%	
Ewes	380	1600	545	1105	64	298	3992
Lambs		1959	547	829		444	3779
Shearlings		166		798		377	1341
Rams		68		119		8	195
Unidentified		7333		14617		814	22764
Totals ...	380	11126	1092	17468	64	1941	32071

Symptoms of Dieldrin Poisoning

The symptoms of Dieldrin poisoning are nervous in type, characterised by hypersensitivity, convulsions, and depression, and follow the same general pattern observed with other chlorinated organic insecticides. The Dieldrin toxic reaction commenced 6 to 48 hours after exposure to the insecticide, and in some cases it was seven days before the affected animal had recovered completely from the intoxication. The first symptom of the reaction was that of mental confusion, manifested by a persistent nibbling at the ground, accompanied by salivation, and a backward circling movement. Inco-ordination next became apparent, and the animal showed a tendency to totter, and abducted its legs in an effort to retain its balance. The onset of convulsions was marked by violent head jerkings, with grinding of the teeth, and salivation. The convulsive seizures, which were opisthotonic in type, lasted a minute, and were associated with a galloping movement of the legs.

The toxic syndrome represented excitement phases, which alternated with periods of depression. The excitement phases, in which symptoms of a diffuse central nervous stimulation were apparent, were common in the early stages of the reaction but gradually diminished in frequency and intensity, until the depression phase predominated. Nevertheless, severe convulsions occurred some considerable time after the onset of toxic symptoms, and in cases of fatal poisoning, death took place from respiratory failure during a convulsive seizure, from 12 hours to four days after the exposure to the Dieldrin. In two cases sheep, which had shown signs of Dieldrin intoxication, from which they had apparently recovered, were found dead 10 days after dipping. *Post-mortem* examination revealed pneumonic lesions.

Treatment of Dieldrin Poisoning

There is no specific antidote for poisoning by Dieldrin, or any of the chlorinated hydrocarbon insecticides. However, a number of workers have suggested that full doses of calcium borogluconate are of value, and the United States Department of Agriculture (1953), recommends the removal of the insecticides from the skin with a detergent, or from the alimentary tract with full doses of magnesium sulphate, followed in either case, by the induction of chloral hydrate narcosis. Some indication as to the prognosis of a Dieldrin toxic reaction in sheep is given by the fact that seven of the 15 animals which suffered a toxic reaction in this trial recovered.

Post-mortem Findings

There were no lesions observed on a *post-mortem* examination which were characteristic of Dieldrin poisoning. However, the majority of animals dying from Dieldrin poisoning did present a number of features which can be of value in confirming a suspected case of poisoning, as the examination of the outer surface of the body and the natural orifices provided an indication as to the manner in which the animal had died. From the evidence at present available, death from Dieldrin poisoning always takes place during an opisthotonic convulsion, during which the animal suffers abrasions of the orbital region, knees, and coronets, and cuts of the lips and gums.

A number of sections of liver, kidney, brain, and spleen from animals which had been exposed to Dieldrin intoxication, were microscopically examined. Damage to both liver and kidneys was apparent in the majority of cases, but no abnormality of the spleen was observed. The liver and kidney damage was manifested by an increase in red blood cells, with cloudy swelling of the liver cells, and the cells of the kidney tubules. Following the administration of large doses of Dieldrin, areas of liver necrosis were apparent in those animals which survived for sufficient time to allow the degeneration to occur. There was no sign of damage to brain cells or nervous tissue, in the limited number of sections examined.

IV. Discussion

The results which followed the repeated exposure of sheep to Dieldrin at intervals of 14 to 21 days show that the excretion of the insecticide is slow, and that there is a cumulative effect. This finding has been reported previously by Claborn *et al.* (1953), in sheep and cattle, and occurs with other chlorinated hydrocarbon insecticides. However, the slow excretion of the insecticide has little significance in this instance, as it is unlikely that Dieldrin will be used as a sheep dip more than once or twice a year for maggot fly control.

Sheep absorbed insufficient Dieldrin from a single immersion in 1 per cent. Dieldrin (which is equivalent to an application of 700 mg. per kg.), to cause a toxic reaction which could otherwise be induced by the oral administration of 25 mg. per kg. of Dieldrin. The main toxic hazard, therefore, in the use of Dieldrin as a sheep dip is that of swallowing the dip wash; nevertheless, there is an adequate margin of safety as the oral ingestion of 1,500 ml. of a 0·05 per cent. Dieldrin wash would be needed to cause a toxic reaction in a 65-lb. sheep. Guinea-pigs can withstand approximately four times the oral toxic dose of Dieldrin applied externally, whilst in mice it makes no difference whether the toxic dose is administered internally or externally. A possible explanation for this difference in the ratio of oral to dermal toxicity may lie in the cleaning habits of the various animal species. Mice lick themselves thoroughly and probably remove and ingest a large amount of the insecticide retained on the coat following the dippings. Guinea-pigs only lick themselves to a limited degree, and self licking for cleaning purposes does not occur in sheep. The oral ingestion of Dieldrin licked from the coat would therefore be considerably lower in guinea pigs, and practically absent in sheep. The results of this investigation indicate that there should be no injury to the health of sheep from toxicity following a single dipping in 0·05 to 0·1 per cent. Dieldrin, which is the concentration recommended by Stones *et al.* for the control of maggot fly (*Lucilia sericata*) in Britain.

Acknowledgment.—The writer wishes to express his thanks to those members of the Cooper Technical Bureau who have helped him with this experimental work and, in particular, his assistant, Miss Ratcliffe. He is also grateful to Messrs. Cooper, McDougall and Robertson for their permission to publish the results.

SUMMARY

The toxicity of Dieldrin as a sheep dip was studied because of the value of the insecticide in the prevention of maggot fly strike.

Preliminary tests with mice and guinea-pigs indicated that the acute oral L.D.50 of Dieldrin to mice and guinea-pigs approximated to 75 mg. per kg. and 25 mg. per kg. respectively.

The acute oral L.D.50 of Dieldrin to sheep was assessed at 50 to 75 mg. per kg.

Approximately 50 per cent. of groups of mice and guinea-pigs died when immersed in Dieldrin concentrations of 0·10 and 0·25 per cent. respectively.

Sheep survived a single dipping in Dieldrin concentrations of 0·5 to 1·0 per cent. without ill effect.

A total of 32,000 sheep, representing 52 flocks, were immersed in dip washes containing 0·05 to 0·6 per cent. Dieldrin, without evidence of a Dieldrin toxic reaction.

The symptoms of Dieldrin intoxication are nervous in type and manifested by hypersensitivity, convulsions, and depression.

It is concluded that no injury to the health of sheep from toxicity should result following a dipping in 0·05 to 0·10 per cent. Dieldrin, which is the concentration range recommended in the United Kingdom for the control of maggot fly strike.

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"SEQUESTRENE" ("E.D.T.A.")* AS AN ANTICOAGULANT FOR EQUINE BLOOD

BY

R. K. ARCHER,

ANIMAL HEALTH TRUST, EQUINE RESEARCH STATION, NEWMARKET

Citrate or oxalate mixture used as anticoagulants may cause crenation of red blood cells and changes in the nuclear pattern of leucocytes. The distortion is often so great, even when the optimum proportion of anticoagulant to blood is used, that accurate differential counts of leucocytes cannot be made.

"Sequestrene," the disodium salt of ethylene-diamine-tetra-acetic acid, appears to have all the advantages of the common oxalate mixtures as an anticoagulant without producing cellular distortion to a comparable extent. Its use in human haematological studies has been reported by Proescher (1951), Dillard *et al.* (1951), and Hadley & Larson (1952). It is agreed that "Sequestrene" is a reliable anti-coagulant for routine work and that it does not produce cellular degeneration as rapidly as do oxalate mixtures.

The Equine Research Station of the Animal Health Trust at Newmarket is called upon to examine many peripheral blood samples from animals in outlying areas and the problems arising from delay in delivery of specimens to the laboratory are considerable. Delays up to 48 hours are usual, and in this time unstained, unfixed blood smears show marked degenerative changes, while oxalated blood is quite unsuitable for making further smears after such a time interval.

Accordingly investigations were undertaken to determine the suitability of "Sequestrene" for the purpose, and various amounts and concentrations were tried. The most satisfactory concentration proved to be 0·6 ml. of a 1 per cent. solution of "Sequestrene" to 5 ml. of equine bood. It is in fact quite possible to perform reliable differential counts on smears made from such blood 48 hours after collection.

The proper amount of "Sequestrene" solution is evaporated to dryness in a bijou bottle in a hot air oven for about an hour at 100° C. This compound is stable to 150° C., but if dried at a temperature higher than 100° C. it becomes difficult to dissolve in the added peripheral blood. Proper solution and mixing are very important; a reliable method is to roll the bijou bottle between the hands for half a minute.

If a concentration greater than 0·6 ml. of 1 per cent. "Sequestrene" to 5 ml. of equine peripheral blood is used, there is some nuclear pyknosis of the leucocytes. If a lesser concentration be used there is crenation of the erythrocytes and there may be coagulation of the sample.

"Sequestrene" is a useful anticoagulant for bone marrow fluid withdrawn at biopsy, for which purpose a higher concentration is required than for peripheral blood. Present practice is to add ½ ml. of marrow fluid to a standard prepared bijou bottle (*i.e.*, containing 0·6 ml. of 1 per cent. "Sequestrene"); this enables special smears and techniques to be carried out in the laboratory for up to two hours after collection.

Acknowledgments.—This communication has been prepared while working under Sir Lionel Whitby, Regius Professor of Physics, at the Department of Medicine, Cambridge, and at the Equine Research Station, Newmarket, of the Animal Health Trust during the author's tenure of an Equine Research Fellowship of the Trust.

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*The disodium salt of ethylene-diamine-tetra-acetic acid is obtainable from L. Light & Co. Ltd., Colnbrook, Buckinghamshire.

THE ROYAL SHOW

BY

E. S. PATERSON

(One of the Officially Appointed Veterinary Surgeons)

I have been asked by the Editor to contribute some remarks on items of veterinary interest on The Royal Show. I suppose The Royal should be of interest in its entirety, as it is the great shop window display of the Agricultural Industry on whose life and prosperity the Profession in the main depends. To comment on, in fact even to see, the whole Show is an impossible task, so I have selected some of the things which have left an impression on my mind.

Having seen The Royal at Windsor in 1939 but in no official capacity, it was with an added interest that during the last 12 months I watched the site grow from green fields to the small "town" which makes up the completed construction of the Show, and wondered what sort of task it would be to be one of the veterinary officers. It says much for the organising ability of Major Brennan de Vine, the chief V.O. since 1923, that only five veterinary surgeons, one other being co-opted to assist in the dentitioning of the large entry of pigs, were necessary to carry out the many duties required.

It struck me when examining before entry into the Show how adaptable and tough our stock must be. Many animals had travelled long distances, and yet arrived in excellent condition. The only one I saw that needed any attention was a foal with colic. The housing and living conditions were, of course, very different from those to which the animals were accustomed, being under canvas, and subject to the changes associated with living in tents. But the number which received treatment were comparatively few, and in the main consisted of chills, calvings, cleansings, milk fevers, acetonaemia, colic and minor injuries, and a dose of morphia for a sow in oestrus who was due on television.

It was the general opinion of the experts that the quality of the stock was as good as ever, and the champions of the various breeds must have impressed the many overseas visitors. The general impression of prosperity among the stock breeders should give encouragement, and would seem to belie the current impression that a slump in agriculture may be imminent.

It was good to see over a hundred entries in the farriery classes, compared with just over 60 last year. The quality of the workmanship was of a high order. It may be wishful thinking, but one is given perhaps a faint hope that the day when the shoe is made to fit the foot, instead of the foot the shoe may not have gone for ever, and it was encouraging to see special prizes offered to apprentices and those under 18 years of age. It is a sign of the times that some of the competitions moved from the anvil to the bench and proved themselves just as expert with the welding plant.

Of the many hundreds of stands ranging from tractors to tweeds, and mowers to mannequins modelling some of the end products of wool (and very nice too), I noticed one stand showing the damage that can be done to hides. Warbles were of course the chief offender, but I was amazed to see a skin deeply scored and ruined from the affects of horning. Another small argument in favour of de-horning? The rural craftsmen, saddlers, thatchers, hurdle makers, etc., and that fascinating man, the potter, making outsize flowerpots, all demanded attention, and so on up and down the avenues *ad infinitum*.

A spectacle which would have pleased some of the older members of the Profession was the display of historic vehicles, many of which they would have known in the days of their use. The coaches, road, mail, and park, the London bus, "growlers" and private vehicles of all shapes and sizes made a delightful sight, as they were driven round the ring with the drivers and passengers in appropriate costume. I have no doubt that the thought of the stables full of horses, when the veterinary surgeon was indeed the "horse doctor," would bring back nostalgic memories, and perhaps a sigh for the good old days, and to perdition with retained placentas, trace element deficiency diseases, "hard pad" and the other complications of modern times.

CLINICAL COMMUNICATION

TUBERCULOSIS IN WILD BIRDS

D. LUKE,

The Farm, Stormont, Belfast

It is probable that most species of birds are susceptible to infection with the avian type of the tubercle bacillus and records of this disease in a variety of wild birds are to be found in the literature. It is probable that the disease is commoner in wild birds than is generally supposed and in this connection the following case histories are of interest.

1. Black Headed Gull (*Larus ridibundus*).—This bird was picked up apparently paralysed on one of the Copeland Islands at the entrance to Belfast Lough. It was able to flap its wings, but was unable to fly. It was killed and submitted to the laboratory for examination.

The carcase was in very poor condition and no evidence of any injury was found. The liver was studded with irregular greyish yellow nodules varying in size from being just descernible up to the size of a pea. The spleen was a mass of pea-sized nodules. Similar nodules were found along the gut, and a large lesion was found between the third and fourth thoracic vertebrae.

Smears prepared from the lesions showed numerous acid-fast bacilli. Spleen emulsions inoculated into two chickens produced generalised tuberculosis, and cultures from the liver on Dorset's egg medium yielded growths showing the characteristics of avian type tubercle bacilli.

2. Sparrow Hawk (*Accipiter nisus*).—This bird had caught a sparrow and dropped with its prey into a small thicket. It was caught by a farmer who was working nearby. It was kept closed up for a few days where it fed readily taking its prey either live or dead. On the fourth day it was found dead.

This bird was a male in very poor condition, and from the appearance of its plumage it was adjudged to be about 15 months old. Widespread lesions were present in the liver and spleen. Intestinal lesions were numerous and there were signs of a diarrhoea. Acid-fast bacteria were found in smears though they were not so numerous as in the previous case. Bacteriological culture yielded a growth characteristic of the avian type bacillus.

3. Jackdaw (*Corvus monedula*).—This bird had been shot on a farm. It was in good condition. Lesions in the liver and spleen were fairly numerous. Several large lesions were found along the intestine. Again bacteriological culture yielded typical avian type bacilli.

The findings reported above emphasise the possible rôle played by wild birds in the dissemination of tuberculosis in poultry flocks. The source of infection in these cases can only be speculated upon. Jackdaws and Black Headed Gulls do frequent poultry runs and so could easily become infected from flocks excreting tubercle bacilli. The Sparrow Hawk on the other hand is much more circumspect in its feeding habits and in the ordinary way takes its prey on the wing though it will come to the ground to eat it. It may take young chickens, however, though of a size not likely to be infected with tuberculosis. It seems more probable that it became infected through eating some small feral bird such as a sparrow which commonly consorts with domestic poultry and so would have greater opportunities for contracting infection.

ABSTRACTS

Johne's Disease Haemagglutination Test*

Tests were carried out on two groups of cattle respectively sensitised by the intraperitoneal inoculation of either killed johne or bovine tubercle bacilli and on other animals in herds with and without a history of Johne's disease.

The serum for test was inactivated and the heterophile antigen was removed. Sheep red cells sensitised by incubation with PPD johnin were then added to a series of serum dilutions. The agglutination titres were read after three hours and again 12 hours later.

The animals artificially sensitised to either johne or tubercle bacilli had titres to 1 : 128 (the highest dilution tested) but it was noted that the clumps produced by the sera from johne sensitised cattle were appreciably longer than those in the tubes containing sera from tuberculosis sensitised cattle. It was arbitrarily decided to regard a titre of 1 : 32 or greater as positive since sera from many normal cattle were positive at a titre of 1 : 16. Sera from 10 intradermal johnin reactors in known johne infected herds were positive but 15 cattle negative intradermally were positive to the haemagglutination test. The value of these observations were minimised since no *post-mortem* examinations were made.

J. S. P.

* **A Modification of the Middlebrook-Dubos Haemagglutination Test for Use in the Diagnosis of Johne's Disease.** Larsen, A. B., Porter, D. A., & Vardaman, T. H. (1953). *Amer. J. vet. Res.* **14**. 362.

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Post-vaccination Response of Calves to Intracutaneous and Subcutaneous Vaccination with Strain 19*

Under field conditions, two groups, each of 108 calves, were vaccinated respectively with Strain 19, either 0·2 ml. intracutaneously (i.c.) or 5·0 ml. subcutaneously (s.c.). Half the number of animals in each group were on known brucella-infected farms, the remainder were in herds believed to be free from infection. Agglutination, opsonocytophagic tests and some haematological studies formed the basis of comparison. The production of opsonins and agglutinins in the i.c. group was equal to those produced in the s.c. group. Agglutinins were measurable on the fourth day, reached their peak by the 11th day and had markedly declined by the end of the sixth month when the i.c. calves were substantially negative (97·2 per cent.). Of the s.c. group 20 per cent. still had some agglutinins after two years. A marked rise of opsonins was noted after three days and the peak was reached on the fifth and sixth days. The opsonic indices were high for 18 months after which time they declined.

Exceptions to the above pattern occurred in 16 calves (eight in each group) which had been suckled by positive cows. The response in these animals was poor indeed. Some remained negative post vaccination whilst others developed but transitory titres. These animals appeared to be susceptible to brucellosis in later life.

Variations in the erythrocyte count were negligible. In both groups an initial leucocytosis lasting 48 hours and due to an increase in neutrophils was followed by a secondary lymphocytosis which persisted for seven or eight days after which the blood picture returned to normal. With the decline of titres there appeared to be an increase in the number of eosinophils.

J. S. P.

* **An intensive Study of post-vaccination Responses in Groups of Calves Vaccinated intracutaneously and subcutaneously with Strain 19. *Br. abortus* vaccine.** Cotton, Cornelia M. (1953). *Amer. J. vet. Res.* **14**. 337.

REVIEW

[Cat Care. By Dr. Leon Whitney, D.V.M. 264 pp. Illustrated. Published by Victor Gollancz Ltd., Covent Garden, London. Price 18s.]

We are glad to welcome at long last a book devoted exclusively to feline diseases and management, as nothing to our knowledge has appeared since Kirk's " Diseases of the Cat " was published 29 years ago.

It is astonishing that the cat should have been so overlooked, since it is a prolific source of income to many practitioners, and exists in its millions throughout the country.

Whitney's book is written in a breezy style and makes quite interesting and instructive reading. Its advice is directed predominantly to the layman cat-owner, and there is a tendency throughout the work to encourage laymen themselves to *diagnose* and treat cat ailments, and to call a veterinary surgeon only when these untrained people are completely baffled—as they are likely to be.

In the diagnostic tables on pages 12 and 13 we find there are many important omissions, particularly hair ball from " abdominal enlargement " ; distended bladder from " abdominal tenderness " ; tartared teeth from " difficulty in feeding " and from " slobbering " ; fever from " loss of appetite " ; worms from " ravenous appetite " ; senility from " emaciation " ; specific enteritis from " vomiting " ; gastritis from " excessive thirst " ; and so on.

Diagnosis—of all things—is the one great obstacle which the uninitiated (and not infrequently the expert) cannot surmount, and it seems essential to establish this before attempting any therapeutic measure.

In part one of the book, 23 pages are devoted to anatomy and physiology, 20 pages to foods and feeding, and 21 to diseases, their transmission and treatment. Part two includes dissertations on first-aid, surgery, administration of medicines, problems of reproduction, and euthanasia. Part three seems to consist of a reconsideration of all the foregoing plus heredity, and feline diseases contagious to man. It is certainly very comprehensive, though some of it is possibly over the head of the average layman. Yet

it is all explained in lucid terms and should be enlightening to all who previously were entirely ignorant of the body structure, its functions, diseases, and their treatment.

Whilst, in general, we are very well disposed to this book, we take exception to quite a number of statements, such as that rickets " is probably the most common deficiency disease " (p. 86); or that leptospirosis ever occurs in the feline species (p. 193). We are perturbed to find DDT recommended (p. 104) for use as a liquid shampoo, and positively alarmed to see on p. 224 that it should be mixed with a *penetrating oil* for application to a cat's skin. In our experience DDT is very toxic for cats, the toxicity being very greatly increased when rubbed in as an oily suspension.

It has no antidote, and we believe it to be most unwise to suggest that any novice should be encouraged to use it on a cat.

Similarly, warning might have been given on p. 106 against the use of tar oil, as apart from absorption through the skin, some of it would be licked and set up poisoning.

Many other divergencies of opinion occur throughout the book, but it is not our purpose to labour destructive criticism; rather to welcome any increase of basic knowledge among cat-owners as being the best insurance against the application of entirely erroneous and ignorant beliefs and practices upon the helpless patient.

QUESTIONS IN PARLIAMENT

Landrace Pigs (Atrophic Rhinitis)

Sir A. Bossom (July 20th) asked the Minister of Agriculture if he will inform all owners of Landrace pigs individually of the standstill order being imposed owing to the outbreak of atrophic rhinitis, in order to minimise the risk of spreading this disease, hitherto unknown in this country.

Sir T. Dugdale : Following confirmation of the existence of atrophic rhinitis last May, notices restricting the movement of all Landrace pigs imported in 1953, and their progeny and all other contact pigs were served on 514 owners under the Atrophic Rhinitis Order, 1954. The restrictions on 511 of the farms have since been removed and I hope it will be possible to lift the restrictions from the remaining three farms shortly.

* * *

Meat Inspection

Mr. Peter Freeman (July 21st) asked the Minister of Food whether he will place the inspection of all meat under the control of veterinary surgeons as recommended by the recent report, a copy of which has been sent to him, of the committee formed to investigate this matter particularly in view of the fact that this is the custom in most other cases in Western Europe.

Major Lloyd George : The inspection of meat and the appointment of the necessary officers are matters within the responsibility of local authorities under the Food and Drugs Act.

Mr. Freeman : In view of the fact that nine-tenths of the cases of food poisoning are traceable to meat, would it not be better to have meat inspection under the control of people trained in the matter, rather than under that of sanitary inspectors who are not ?

Major Lloyd George : That is a matter of opinion. The veterinary people naturally think that they are the best at the job. Curiously enough, the sanitary inspection people think they are. On the whole, the best thing to do is to have a compromise and to permit such arrangements as are carried out by the city of Manchester, for instance, where they work side by side with great proficiency.

Mr. Baldwin : Is my right hon. and gallant Friend aware that the report was issued without having any proper inspection of slaughterhouses ? Is he aware that for the veterinary profession to get this matter into their hands is wrong, and that sanitary inspectors, generally speaking, are trained in the inspection of meat, and that it would be better to leave the work to the sanitary inspectors ?

Myxomatosis

Mr. Awbery (July 22nd) asked the Minister of Agriculture if he will now make it a criminal offence for any person to spread myxomatosis, owing to the cruelty to rabbits, the danger to human beings, and the difficulties of stopping the spread of this disease once started ; and if he will take early steps to adopt a more humane method of destroying these pests.

Mr. Nugent : The Myxomatosis Advisory Committee advised that no attempt should be made to assist the spread of the disease, but that no attempt could usefully be made to stop it. This advice has already been accepted. The committee is to consider the present situation on July 26th and the problem will be further examined in the light of their advice. The committee found no apparent risk of danger to man from the disease. A great deal is already being done to encourage humane methods of destruction and in particular to develop a humane alternative to the gin trap. I have to-day announced the membership of the committee which has been set up to expedite this work.

Mr. Hayman asked the Minister of Agriculture whether he will make a statement on the incidence of myxomatosis in Cornwall.

Mr. Nugent : The first outbreak of myxomatosis in wild rabbits in Cornwall was confirmed on May 11th last. Since then the disease has been found to exist in six other areas in the county.

NOTES AND NEWS

Diary of Events

Sept. 19th—25th.—72nd Annual General Meeting and Congress of the British Veterinary Association at Torquay.

Nov. 16th & 17th.—B.V.A. Conference on the Feeding of Farm Livestock for Health and Production in the South Hall, Victoria Halls, Bloomsbury Square, London, W.C.1.

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PERSONAL

Engagement.—Nicol—Barlow.—The engagement is announced between Alexander Nicol, M.B., Ch.B., only son of Mr. and Mrs. C. Nicol, 18, Ashleigh Park North, Aberdeen, and Barbara Jean Barlow, M.R.C.V.S., only daughter of Mr. and Mrs. F. B. Barlow, Floraby, Lea, Preston.

* * * * *

Forthcoming Marriage.—Owen—Robinson.—On July 21st, 1954, at Sutton Coldfield. Anthony Owen, M.R.C.V.S., second son of Mr. and Mrs. W. L. Owen, of Cuddington, Cheshire, to Pamela Fennell Robinson, M.R.C.V.S., only daughter of Mr. G. W. Robinson and the late Mrs. Pamela Robinson, and stepdaughter of Mrs. Beatrice Robinson, all of Stockport, Cheshire.

* * * * *

Births.—Barnsley.—On July 18th, 1954, at 5, Trinity Street, Bungay, Suffolk, to Molly (*née* Wood), wife of D. Barnsley, M.R.C.V.S., a daughter—Jane Clare, sister for Timothy.

Davies.—On July 12th, 1954, to Betty, wife of D. R. T. Davies, M.R.C.V.S., Llyswedog, Tredegar, Mon., a son, Andrew Lunan —a brother for John and Heather.

* * * * *

R.C.V.S. OBITUARY

Ferguson, Hugh Halbert, 6, Suez Street, Warrington, Lancs. Graduated New Edinburgh, December 20th, 1897. Died October 18th, 1953, aged 79 years.

Macdonald, Duncan, O.B.E. (Major, late R.A.V.C.), of The Crest, West Brabourne, Ashford, Kent. Graduated New Edinburgh, May 30th, 1899. Died July 19th, 1954 ; aged 78 years.

Major Duncan Macdonald, O.B.E., M.R.C.V.S.

An Appreciation

The death of Uncle Mac, as he was known to all his friends, on July 19th, 1954, at the age of 78 saw the passing of one of the old brigade, who, during his army career and since his retirement in 1924, made more friends than one could count. He was a man of sterling character, a true Scot with all the attributes of his race, always cheerful and full of fun and a staunch friend.

He qualified in Edinburgh in 1899 and was commissioned in the Army Veterinary Corps in 1904 ; during his army career he served in many places including India, and during the 1914–18 war he was in France where he was awarded the O.B.E., and mentioned in dispatches four times. After the war he served in Constantinople and Tiflis.

He was an inspiration to us all and an example of how to grow old but keep young in heart. These qualities endeared him to everyone, but our admiration for him was never greater than during the past two years when, in spite of great suffering, he never lost heart, and even on the day of his death cracked a joke with me. No man had a better wife, and our deepest sympathy goes out to Mary in her great bereavement.

The funeral took place on Saturday, July 24th, the service being held at Brabourne Church ; he was interred at the Kent County Crematorium, Charing. The Director and Officers of the R.A.V.C. and the Old Comrades Association, R.A.V.C., were represented by Brigadier E. S. W. Peatt, and Mr. P. S. Hastie represented the B.V.A.

E.S.W.P.

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FORTHCOMING CONGRESS

THE FEEDING OF FARM LIVESTOCK FOR HEALTH AND PRODUCTION

The B.V.A. is making plans for an Autumn Conference to discuss the feeding of farm livestock for health and production.

It will be held on two consecutive days—Tuesday and Wednesday, November 16th and 17th, 1954—in the South Hall, Victoria Halls, Bloomsbury Square, London, W.C.1.

The Conference will be open to members of the Association and to members of ancillary associations and trade associations. Admission will be by ticket. Arrangements for issue of the tickets will be announced. A full programme will be published in due course.

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THE NEXT "SUPPLEMENT"

Will Hon. Secretaries of Divisions and any other members of the Association wishing to offer material for publication in the Supplement to the *Record* kindly note that the next number will be going to press shortly. The Editor will be greatly obliged to have all manuscripts in his hands not later than Saturday, August 7th.

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THE ROYAL COLLEGE OF VETERINARY SURGEONS

Professional Examinations, July, 1954

University of Glasgow Veterinary School

Passing Fourth Professional

Name	*Hometown*
Haresnape, Ian Clark	Blackpool
Taylor, C. M.	India
Torrance, Douglas S.	Shotts

Passing Final Professional

Name	*Hometown*
Berger, Fishel	Glasgow
Taylor, James W.	Airdrie
Watson, James M.	Strathaven
Watson, John D.	Glasgow
West, R. C. A.	Clarkston

UNIVERSITY OF EDINBURGH

B.Sc. Degree in Veterinary Science

At a Graduation Ceremonial held on July 21st, the following Degree was conferred by the University of Edinburgh on :

Chong, Sip Ngow, M.R.C.V.S.
Ferguson, Alan Robert, M.R.C.V.S.
Stewart, Anthony Forrest, M.R.C.V.S.
Vizard, Douglas John, M.R.C.V.S.

These four graduates qualified M.R.C.V.S. at the Examinations held at the beginning of this month.

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THE WILLIAM GOODALL GIBSON FELLOWSHIP

The William Goodall Gibson Fellowship for 1954 has been awarded by the University of Edinburgh to Mr. Leslie James Park Duncan, B.SC., M.B., CH.B., M.R.C.V.S., to undertake research work in the Clinical Laboratory of the Royal Infirmary of Edinburgh.

Mr. Duncan qualified M.R.C.V.S., and graduated B.Sc. in Veterinary Science of the University of Edinburgh in 1944, and was FitzWygram Prizeman in that year. He graduated M.B., Ch.B. of the University of Edinburgh in 1951.

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ADDRESSES OF DISEASE-INFECTED PREMISES

This list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Anthrax :

Cumberland.—Orchard House, Mellguards, Southwaite, Carlisle (July 22th).

Yorks.—Salt Pie Farm, Norwood, Otley (July 20th).

Fowl Pest :

Essex.—Fairlawn, Bulpham, Upminster (July 21st).

Lancs.—Beechcroft, Town Lane, Much Hoole, Preston (July 21st).

Leics.—Gaddesby Lane, Frisby-on-the-Wreake, Melton Mowbray (July 22nd).

Swine Fever :

Cambs.—Manor Farm, Coveney, Ely (July 22nd).

Ches.—83, Saughall Massie Road, Upton, Wirral (July 24th).

Devon.—Higher Olchard Farm, Ideford, Newton Abbot (July 21st); Court Farm, Abbotskerell, Newton Abbot ; Lee Farm, Bickington, Nr. Newton Abbot (July 22nd) ; "Rosemount," Canada Hill, East Ogwell, Newton Abbot ; Bodmiscombe Farm, Blackborough, Cullompton (July 24th).

Essex.—Northend Place, Northend, Great Waltham, Chelmsford (July 22nd).

Flints.—Thottafod Farm, Pontbly Hyn, Mold (July 23rd).

Gloucs.—Hawker Hill, Mitcheldean (July 20th) ; Cleeve Hill Farm, Badminton Road, Downend, Fishponds (July 20th); Linbricks Farm, Water Lane, Oakbridge, Lynch, Stroud (July 23rd).

Lancs.—Plots 85, 45/47, Dorothy Street, St. Helens ; Brookside Poultry Farm, Westhoughton (July 20th) ; Piggeries, Siding Road, Fleetwood (July 21) ; Sandway, Holmswood, Rufford, Ormskirk (July 22nd).

Lincs.—Glebe Farm, Belchford, Horncastle (July 22nd) ; Ideal Cottages, Claypole, Newark (July 23rd).

Salop.—Somerwood House, Somerwood, Uffington (July 22nd).

Somerset.—Higher Sticklynch Farm, West Pennard, Glastonbury July 24th).

Staffs.—Owletts Hall Farm, Lynn Lane, Lynn, Shenstone, Lichfield; Holding, Honeywall, Stoke-on-Trent (July 22nd).

Warwicks.—Wheeley Moor Farm, Coventry Road, Coleshill, Birmingham (July 21st).

Worcs.—The Piggeries, Wickhamford Lane, Evesham (July 22nd).

Yorks.—Heys Farm, Diggle, Oldham (July 20th).

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

FROZEN SPERMATOZOA

Sir,—It appears to be necessary again to amplify statements by Mr. Blackshaw and Dr. Emmens (*Vet. Rec.*, May 22nd, 1954). Maximow (1912), to whom they refer, observed that glycerol had some effect in preserving the morphological appearance of certain plant cells frozen to temperatures between —5° and —22° C., but he obtained better results with sugar solutions. There seems to be considerable doubt as to whether the cells in question were still alive. Rostand (1946), also referred to by your correspondents, was able to protect frog spermatozoa against a temperature of —4° to —6° C. by the addition of glycerol to the medium, but he states that he failed to obtain similar results with mammalian spermatozoa. In the vast literature on the biological and biochemical effects of glycerol there are several other papers which could now be represented as relevant, but which played no part in recent developments.

I find it difficult to sympathise with the complaint of Mr. Blackshaw and Dr. Emmens that their work has been overlooked. At this distance it is necessary to rely on the literature, and, so far as I am aware, the only relevant publications by Mr. Blackshaw and Dr. Emmens up to the date of their letter of November 28th, 1953, are those listed therein, *i.e.*, the paper of September, 1950, dealing with the effect of various glycols and sugars in preserving motility in frozen and thawed ram, bull and rabbit spermatozoa, and the abstract of a paper read to the Physiological Congress in September, 1953. The Symposium of the Society for Animal Breeding, held in February, 1953, dealt largely with the fertility of frozen bull semen, whereas the 1950 paper by Blackshaw and Emmens dealt only with motility. If as Mr. Blackshaw and Dr. Emmens imply, their paper was ignored by several independent contributors from different centres, then the fact is presumably significant.

Once again, I deplore this disagreement with an old colleague, and regret that Dr. Emmens gave me no indication of his feelings on the subject when I had the pleasure of seeing him during his visit to this country last August.

No doubt the passage of time will put these matters in their proper perspective. In the meantime, so far as I and my colleagues are concerned, this correspondence is now closed. Yours faithfully, A. S. Parkes, National Institute for Medical Research, Mill Hill, London, N.W.7. *July 9th*, 1954.

References

Blackshaw, A. W., & Emmens, C. W. (1953). *Vet. Rec.* **65.** 872.
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Emmens, C. W., & Blackshaw, A. W. (1950). *Aust. Vet. J.*, **26.** 226.
——— & ———. (1953). *Proc. XIXth Internat. Physiol. Congress*, 334.
Maximow, N. A. (1912). *Ber. dtsch. bot. Ges.* **30.** 52.
Rostand, J. (1946). *C. R. Acad. Sci., (Paris).* **222.** 1524.

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REACTORS IN ATTESTED HERDS

Sir,—For some time past I have, as indeed must have many others, been concerned with numbers of reactors appearing in attested herds, sometimes after freedom for years. In the vast majority of cases one cannot trace the origin and in a great number of cases no possible contact with other animals seems possible. Yet we get these reactors cropping up—sometimes perhaps only one or two but sometimes a complete breakdown. The infection must come from some source and I have come to the conclusion after careful thought that one possible source of infection, if not probable, is the sacks in which the foodstuffs are conveyed to the farms. As we all know these sacks are found in all sorts of places and are used for all sorts of purposes, not the least being covering for sick animals. The sacks are collected periodically and returned to the corn merchant or purchased by sack dealers. Presumably these are then refilled and sent out again to the farms without cleansing of any sort ; no doubt frequently from non-attested to attested premises. If we accept the fact that this is a possible source of spread of tuberculosis, then it can equally apply to other diseases—foot and mouth disease, brucella, Johne's Disease and anthrax to mention only a few. Again if we accept the possibility surely the answer is simple, obvious and certain, to substitute strong paper containers for these sacks—the containers could be burnt on the premises when empty. These brown paper bags are at present used successfully for artificial fertilisers and poultry food and are popular with the farmers. By this method I feel certain one possible source of spread of disease amongst farm animals would be eliminated with certainty. I am quite aware there are many other ways in which disease can be spread, but in this case there is a simple and certain remedy. It would be interesting to know the views of others.—Yours faithfully, R. E. S. Tuckey, St. Mary's House, Whitchurch, Salop. *June 16th*, 1954.

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IDENTICAL TWINNING IN MULTIPAROUS ANIMALS

Sir,—Evidence of identical twinning in multiparous animals presents obvious problems. I feel that the following case of "conjoined" twins is enough of a rarity to be of interest. A Chihuahua having her first litter was admitted to this hospital, having produced one normal puppy unaided. The hind quarters of a second puppy were presented, tightly jammed in the pelvis. Caesarean section revealed a puppy, with one head and neck, three front legs, including shoulders ; beyond this point were two complete bodies, the hind quarters being completely separate and equally developed. X-ray showed that the two spinal columns were complete and separate from the last cervical vertebra. Heart, lungs and upper abdominal organs were shared, but urinary, reproductive systems, and large intestine were duplicated.—Yours faithfully, Pamela Reynolds, M.R.C.V.S., 675 St. Clair Ave. West, Toronto, Ontario.

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SKIN CONDITIONS IN THE DOG

Sir,—May I suggest that the skin lesion described in Part 2 of Messrs. Hogg & Holroyd's clinical communication in the last issue of the *Record* is, in fact, not an abnormality at all ? In breeds which have either an undocked tail or a sufficiently long dock (and in fact in many cross breeds), this area of modified skin and hair is present on the dorsal aspect of the tail. I have always regarded it as a normal feature, and certainly all my chows, over a period of some 30 years, have had it. I would go so far as to say that it could be found on all dogs if looked for, although varying considerably in degree, so that in some soft coated breeds it is virtually imperceptible.

It would be most interesting to know the reason for this curious feature—perhaps histologists would tell us in what way it differs from the remainder of the skin. Perhaps it is the equivalent of the preen gland in birds !—Yours faithfully, Joan O. Joshua, 78 Brentway, Finchley, N.3. *July 24th*, 1954.

DISEASES OF ANIMALS ACT, 1950—GREAT BRITAIN

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period	Anthrax	Atrophic Rhinitis	Foot-and-mouth	Fowl Pest	Sheep Scab	Swine Fever
16th to 30th June, 1954 ...	6	—	—	13	—	103
Corresponding period in—						
1953 ...	20	—	1	135	—	110
1952 ...	12	—	43	7	—	27
1951 ...	10	—	—	18	—	50
1st January to 30th June, 1954	150	3	12	541	—	824
Corresponding period in—						
1953 ...	434	—	26	508	—	1,733
1952 ...	274	—	408	121	1	557
1951 ...	260	—	18	494	4	478

Tuberculosis (Attested Herds) Schemes

The number of Attested Herds, *i.e.*, herds officially certified as free from Tuberculosis as at June 30th, 1954, was as follows:—

England	Wales	Scotland	Total (Great Britain)
59,382	30,768	30,913	121,063